PORTOGRAM "DOUBLE THREE"

AC model, £26 15s. (£20 5s. *plus tax* £6 10s.) ; *AC/DC model*, £34 15s. (£26 5s. *plus tax* £8 10s.). *Release date, August*, 1953.

Self-contained portable record reproducer consisting of a three-valve two-stage amplifier and a Garrard three-speed single-record playing unit. Housed in mottled-blue leather-cloth covered case fitted with ivory plastic handle and snap lid fasteners.

AC model is suitable for 200-250V 50c/s; universal model can be used on 200-250V AC/DC. AC models for 40 or 60c/s can be supplied to order. Made by Portogram Radio Electrical Industries Ltd., Preil Works, St. Rule Street, London, SW8.

THE Double Three is a portable record reproducer suitable for playing single 33⅓, 45 and standard 78rpm records. The amplifier consists of a high gain RF pentode V1 followed by a beam tetrode output amplifier, the audio output of which is fed to a 7in. elliptical PM loudspeaker. HT is provided by an indirectly heated half-wave rectifier V3.

Player. The gramophone unit is a Garrard model T/AC or T/U providing three turntable speeds selected by a sliding button positioned to left of turntable. The T/AC unit employs a shaded pole induction motor with dual field coils which, in this case, are permanently connected in series to operate from 200-250V mains.

The T/U unit is fitted with a series wound universal type motor with tapped field coils.

Turntable is friction driven by a spring loaded rubber-tyred intermediate wheel. For standard 78rpm the motor drives the intermediate wheel direct, but for 33⅓ and 45rpm, the motor drive is transmitted through either one or two rubber belt driven pulleys, the appropriate pulley being brought into action by the speed control button.

On the T/AC unit, where mains frequency fundamentally decides speed of motor, the actual turntable speeds are controlled by size of intermediate wheel. Normally, unit is supplied with wheel for 50c/s mains frequency but, when required, wheels for 40 or 60c/s can be fitted.

On T/U unit the speed of motor is controlled by an adjustable pre-set governor fitted to armature shaft.

Pickup head is fitted with a Garrard Astatic turnover crystal cartridge which is provided with separate sapphire stylii for LP and standard recordings. For standard 78rpm records the sapphire used has a tip radius of .0025in., whilst that used for LP records has a tip radius of .001in.

Average output at 1000c/s is .75V for 78rpm, and .25V for 33⅓rpm records. Stylus pressure can be adjusted by knurled nut at rear of pickup arm.

An auto-stop, operated by lever attached to pickup arm base, automatically switches off motor at end of record. An adaptor, which fits over turntable spindle, is provided for large centre hole 7in. 45rpm records.

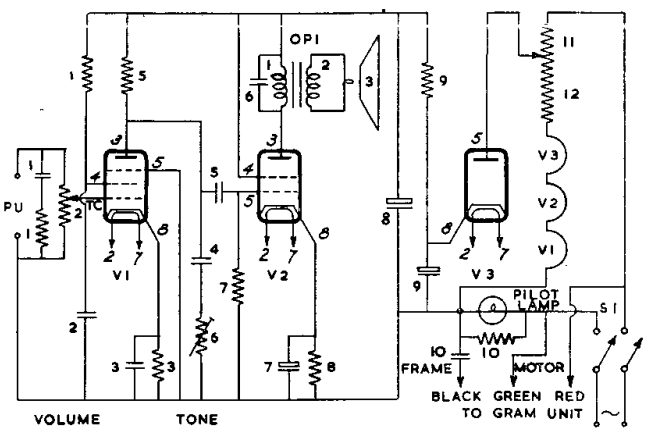
Amplifier. Pickup signal is applied through Volume control R2 to grid of high-gain pentode input amplifier V1. Tone compensation is afforded by R1 C1 connected in series across pickup. Cathode bias for V1 is developed across R3 and decoupled by C3, whilst screen g2 voltage is obtained from R4 with decoupling by C2. Suppressor g3 is connected down to chassis. Amplified signal developed across anode load R5 is coupled by C5 to grid of beam tetrode output amplifier V2.

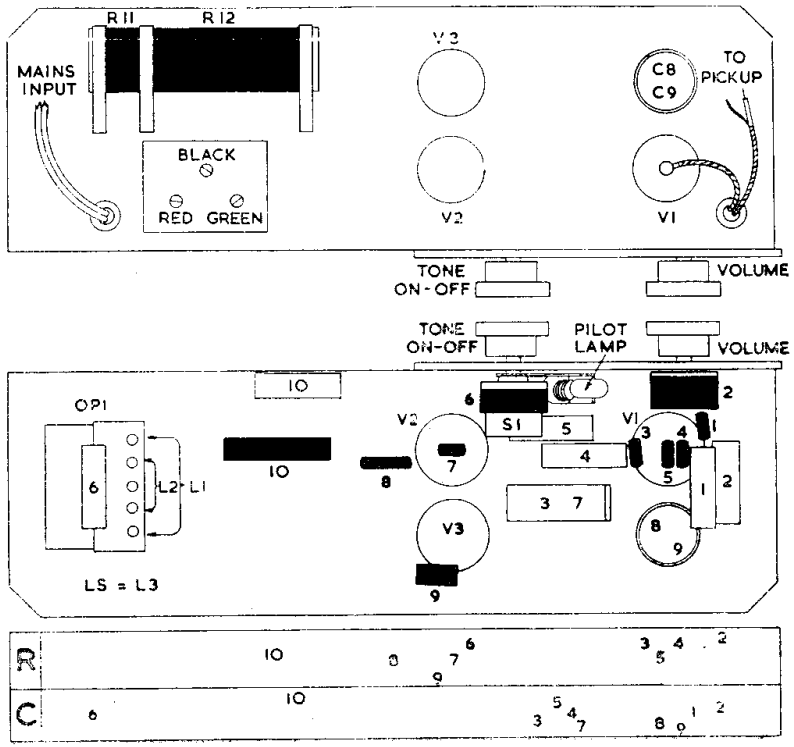
Variable top cut is provided by R6 with C4, which are in series between anode V1 and chassis. R7 is grid load of V2 and R8, decoupled by C7, provides cathode bias. Screen g2 voltage is obtained direct from HT line.

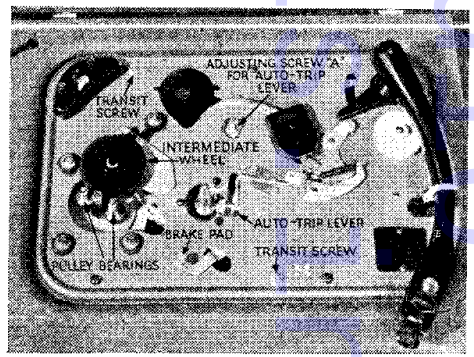
Output signal at anode V2 is transformer coupled by OP1 to a 7in. elliptical PM speaker L3. C6 damps rise in impedance of primary L1 of OP1 at the higher frequencies.

HT is provided by indirectly-heated half-wave rectifier V3 fed from input mains through section R11 of voltage dropper resistor. Resistance capacity smoothing is given by R9 C8 C9.

Reservoir capacitor C9 should be rated to handle 100mA ripple current. *Continued on page* 14.







V1 - 12J7GT	V2 - 35L6GT	V3 - 35Z4GT	PILOT LAMP
G2 30V 3.5MA, G3, A 35V 1MA, H, H, S, K 1.2V, TC, G1	G2 130V 5.5MA, G1, A 120V 41.5MA, H, H, K 7.75V	A 200V RMS, H, H, K 220V 48MA	6.5 V .3 A

SMOOTHED HT LINE = 130 V MAINS CONSUMPTION = .3 AMP

RESISTORS

R	Ohms	Watts
1	56K	½
2	500K Potr.	
3	1K	½
4	250K	½
5	100K	½
6	50K Potr. with DP switch	
7	470K	½
8	150	½
9	2K WW...	4
10	50 WW...	5
11	100 } Tapped Mains	
12	750 } Dropper	

CAPACITORS

C	Capacity	Type
1	.02	Tubular 500V
2	.05	Tubular 500V
3	50	Electrolytic 25V
4	.02	Tubular 500V
5	.02	Tubular 500V
6	.02	Tubular 500V
7	50	Electrolytic 25V
8	60	Electrolytic } 350V
9	40	Electrolytic }
10	.02	Tubular 500V

INDUCTORS

L	Ohms
1	240
2	.6
3	2.75

BYLOCK PAINT SPRAY —*Contd.*

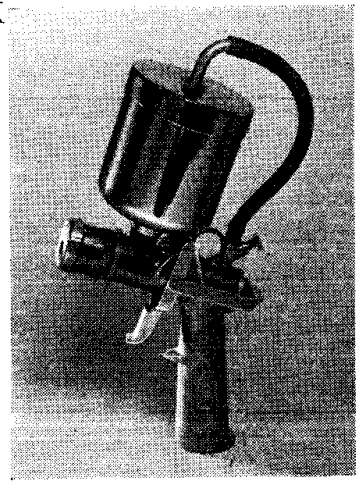


Fig. 5.—By adjusting the spray gun nozzle, either a cone or flat spray can be produced

to obtain the right consistency; if the fluid runs when applied it is too thin or delivery is too great, generally they are:—

Cellulose ..	.. Cellulose Thinner.
Oil Paint, Flat	.. Turpentine or White Spirit.
Oil Paint, Gloss	.. Turpentine.
Distemper, Oil Bound	Water or Distemper Thinners.
Distemper, Powdered	Mix with water or petrifying liquid.

Use the thinners as indicated by the maker wherever possible.

Note: The apparatus will not spray tar.

MAINTENANCE

Lubrication. Motor bearings are of the grease-packed oil-retaining types and should not require any attention throughout life of machine.

Removal of motor and fan unit. Remove top of turbinator and switch, secured by three screws. Remove rubber strip around top of housing. Place hook of spring lifting tool under curl of one spring on motor frame, and with palm of left hand pressed firmly down on motor frame, pull spring upward sufficiently to allow it to be moved over edge of frame. Next remove the spring which is diagonally opposite, and then the remaining two.

Remove earth lead of mains cable from anchor point on inside of turbinator housing (nut and bolt fixing). Loosen mains cable cleat and feed through about 3ft. of cable. Withdraw motor fan unit from turbinator housing.

Removal of motor brushes. These should be replaced when worn down to less than half an inch. Remove motor-fan unit from turbinator housing as described above.

Lift tensioning arm on brush-holder assembly and withdraw brush from holder. Disconnect brush lead from terminal by loosening nut clamping slotted tag. New brushes are obtainable from Bylock Electric Ltd., and under no circumstances should standard types be altered to fit the brush holders.

When new brushes are fitted, connect machine to mains, switch on and check for satisfactory working. Excessive arcing may be due to a dirty or pitted commutator and the use of a "Com-Stick" to clean it may be necessary. If commutator is badly pitted it is advisable to return the motor to the makers for overhaul.

Removal of fan assembly. Normally fans should require no attention. If, however, the necessity

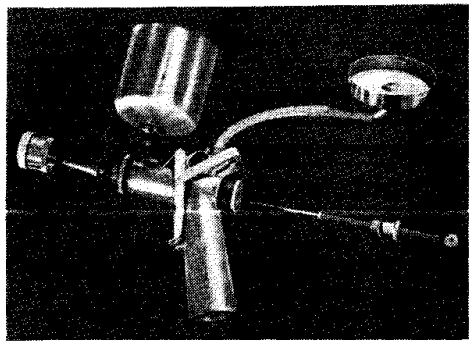


Fig. 6.—An exploded view of spray gun assembly

does arise, the motor-fan unit should be withdrawn from turbinator housing, end cover of fan housing removed, securing nut on end of motor spindle removed (together with spring lock washer), large washer and first fan drawn off motor spindle. Next, carefully prise out baffle plate, remove spacer, second fan, and rear collar (Fig. 4).

PORTOGRAM "DOUBLE THREE"—*Continued from page 12*

Heaters of V1 to V3 are connected in series and fed from input mains through dropper resistor formed by R11 R12.

Pilot lamp is connected across resistor R10 inserted in mains lead to chassis. S1, which is a double-pole on-off switch, is ganged to tone control.

Outer screening of pickup lead, and baseplate and motor of gramophone unit are "earthed" to amplifier chassis through C10.

MAINTENANCE OF GRAM UNIT

Auto-stop. If auto-stop fails to operate, this may be caused by the auto-stop lever being set a shade too low or too high thereby touching the motor frame or trip rod. In this case the adjusting screw "A" should be turned half-a-turn clockwise to raise the trip lever, or anti-clockwise to lower it.

Motor. Motor and intermediate wheel bearings, being of the oil-retaining type, rarely need lubricating. When the need for oil is apparent, remove both belts and, while holding the intermediate wheel out of the way, lubricate the pulley and motor bearings with one spot each of a light grade machine oil. Carefully remove every trace of surplus oil before replacing the belts. Rubber rim, intermediate wheel, the two belts and drive flange on underside of turntable unit must be kept free of oil.

Turntable can be lifted off, to give access to intermediate wheel and pulley, etc. after circlip over spindle is removed.

SERVICING

Amplifier chassis and underside of gramophone unit are accessible if bottom cover panel (held by the four rubber feet fixing screws) is removed.

To remove chassis. Remove bottom cover panel mentioned above. Unsolder the two leads from LS tags and also the screened lead from chassis which is fastened to outer tags on pickup tag panel on underside of gram unit.

Undo and remove the four bolts securing LS baffle to front of case, and then withdraw LS on baffle. Remove the three bolts, with nuts, which attach motor (Red), auto-stop switch (Green), and earthing (Black) leads from tag panel of amplifier chassis.

Chassis can now be lifted out.

Note. When reconnecting the three leads to tag panel, check to see that after bolts are tightened, the tags on ends of wires do not short together or touch chassis (on either side of panel) or the panel fixing rivets.

Gramophone unit can be removed if nuts and triangular washers on end of the three suspension bolts are removed. Before doing this make sure pickup clip is in position over pickup arm—this prevents arm swinging about. Also the unit should be supported by one hand whilst the three nuts, etc., are being removed.

SERVICE CASEBOOK

PYE FVIC

THE set had been in operation just a few viewing hours when we got a call that it had failed with nothing at all to be seen or heard. A check showed the main HT fuse U/S.

The reason—faulty EF80 in the line osc. stage, the valve showing screen grid/control grid insulation down on the Mullard valve tester.

Replaced the valve, put set on soak test for the rest of the day, then back to the customer.

A few more viewing hours passed and again a service call. Symptoms as before. And the trouble was as before—fuse gone and EF80 down in the line ocs. stage.

Out came the chassis. A check on all components failed to show any fault. Replaced the EF80 and the set was OK again. Put it on soak test but kept the back off and facing me on the bench where I could keep an eye on the "innards."

After two days a slight splutter in the region of the line osc. stage, but I caught it in time with a quick tug on the mains flex.

Must be trouble in the line osc. stage, but where ? Checked condensers and resistors, these were OK, blocking osc. primary and secondary readings were near enough, thought I had better put the Megger across the windings just to make sure—and was surprised to get an intermittent reading from near infinity down to 5000ohms. This was sufficient to stop the valve oscillating, hence no bias, and valve drawing excessive current so damaging it. Replacement of the transformer put everything OK.—H. HENSON, Wincanton.

ALBA T394

THIS brand new receiver was unpacked and it proved impossible to centre or focus the picture. Investigation showed that the magnet assembly should be moved forward and to do this meant removing the CRT and then detaching the magnet assembly from its supporting cradle. It was found necessary to remove the thick spacing washers and then refix the whole assembly to its cradle, having thus advanced the magnet up the neck of the CRT by about ¼ to ½ in.

COSSOR PRE-WAR

WEAK signals on both wavebands despite realignment. HT found low due to output valve drawing excessive current, this due to lack of bias. The output valve was directly heated with humdinger across its filament, having centre tap to earth via a biasing resistor. There was no potential difference across this resistor, although the valve was drawing current from somewhere.

Fault was found to be a cathode/heater short on the frequency-changer valve. Since all valves were fed from a common heater winding, the output valve was drawing its cathode current from the cathode circuit of this former valve which had little or no bias on it.

EKCO T161

THE picture was pulling to the left at the top. Adjustment of the line hold to make the uprights of the test card truly vertical, resulted in the middle of the picture tearing and this particular setting was critical and unstable. The cure was replacement of the sync separator valve 20F2.

PYE LV51

CUSTOMER reported loss of sound and vision after ¾ hour approx. Switching on and off rapidly usually cured the trouble but it recurred every 10 minutes or so. Careful checking of chassis revealed the fault to be an excess of solder (in manufacture) on a tag carrying a coaxial feeder to the preamplifier.

PYE V4

AFTER this TV had been in use some weeks it was found that the setting of the line hold control was needing to be turned further anti-clockwise until it eventually reached its extreme ; the picture was by now tearing and pulling, particularly half way down. The cure was to interchange the ECL80 valves used in the line osc. and sound output positions. Picture and sound were now correct and have remained so over a period of several months.

REGENTONE P21

TERRIFIC background noise and crackling was present as the volume control was advanced after the receiver had been on for some time. After some probing it was found that touching the speaker chassis made the noise far worse. The speaker was then bonded to the main chassis and the set became perfect.

REGENTONE U141

RECEIVER only three months old and came in showing pronounced distortion and hum when mains leads were reversed. Voltages were checked and found low but rose as load on rectifier was removed. Reservoir condenser changed but real trouble was the 35Z3 rectifier which was dropping 100 volts. This valve was replaced and the hum and distortion disappeared.—R.H.G.